Washington State Institute for Public Policy

Health Care Benefit-Cost Results

The WSIPP benefit-cost analysis examines, on an apples-to-apples basis, the monetary value of programs or policies to determine whether the benefits from the program exceed its costs. WSIPP's research approach to identifying evidence-based programs and policies has three main steps. First, we determine "what works" (and what does not work) to improve outcomes using a statistical technique called meta-analysis. Second, we calculate whether the benefits of a program exceed its costs. Third, we estimate the risk of investing in a program by testing the sensitivity of our results. For more detail on our methods, see our technical documentation.

Current estimates replace old estimates. Numbers will change over time as a result of model inputs and monetization methods.

Diabetes prevention: Shorter-term programs with group-based counseling

Literature review updated December 2014.

Program Description: All lifestyle diabetes prevention programs target individuals at high risk for developing type 2 diabetes, providing them with counseling and other support. Programs in this specific category are shorter-term, lower cost, group-based counseling programs provided in community settings (e.g., YMCA's, churches).

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Weight change	Primary	6	547	-0.235	0.001	-0.235	0.068	n/a	n/a	n/a	n/a
Fasting glucose	Primary	7	763	-0.292	0.001	-0.292	0.074	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Ackermann, R.T., Finch, E.A., Brizendine, E., Zhou, H., & Marrero, D.G. (2008). Translating the Diabetes Prevention Program into the community. The DEPLOY Pilot Study. American Journal of Preventive Medicine, 35(4), 357-63.

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Ockene, I.S., Tellez, T.L., Rosal, M.C., Reed, G.W., Mordes, J., Merriam, P.A., Olendzki, B.C., ... Ma, Y. (2012). Outcomes of a Latino community-based intervention for the prevention of diabetes: the Lawrence Latino Diabetes Prevention Project. American Journal of Public Health, 102(2), 336-42.

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Diabetes prevention: Long-term, intensive, individual counseling programs

Literature review updated December 2014.

Program Description: All Lifestyle programs target individuals at high risk for developing type 2 diabetes, providing them with counseling and other support. Typical programs in this specific category include three years of active intervention with individual counselling sessions and supervised exercise classes.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Diabetes incidence	Primary	2	1344	-0.533	0.001	-0.533	0.098	n/a	n/a	n/a	n/a
Weight change	Primary	2	1344	-0.298	0.001	-0.298	0.052	n/a	n/a	n/a	n/a
Fasting glucose	Primary	2	1344	-0.453	0.001	-0.453	0.053	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Haffner, S., Temprosa, M., Crandall, J., Fowler, S., Goldberg, R., Horton, E., Marcovina, S., ... Diabetes Prevention Program Research Group. (2005). Intensive lifestyle intervention or metformin on inflammation and coagulation in participants with impaired glucose tolerance. Diabetes, 54(5), 1566-72.

Knowler, W.C., Barrett-Connor, E., Fowler, S.E., Hamman, R.F., Lachin, J.M., Walker, E.A., Nathan, D.M., ... Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle intervention or metformin. The New England Journal of Medicine, 346(6), 393-403.

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Obesity reduction for adults: Behavioral, high-intensity, in-person programs

Literature review updated December 2014.

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components, and often include diet and exercise components as well. For this review of interventions for adults who are obese, we excluded studies that target diabetic populations, as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted face-to-face, with 12 or more sessions a year and a duration of 12 months or more.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Weight change	Primary	12	2070	-0.174	0.001	-0.174	0.050	n/a	n/a	n/a	n/a
Body mass index (BMI)	Primary	9	1357	-0.238	0.006	-0.238	0.087	n/a	n/a	n/a	n/a
Diastolic blood pressure	Primary	8	1641	-0.340	0.040	-0.340	0.165	n/a	n/a	n/a	n/a
Systolic blood pressure	Primary	8	1641	-0.123	0.009	-0.123	0.047	n/a	n/a	n/a	n/a
HDL cholesterol	Primary	7	986	0.049	0.343	0.049	0.051	n/a	n/a	n/a	n/a
LDL cholesterol	Primary	7	986	-0.011	0.827	-0.011	0.051	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Appel, L.J., Clark, J.M., Yeh, H.C., Wang, N.Y., Coughlin, J.W., Daumit, G., Miller, E.R., Dalcin, A., Jerome, G., Geller, S., Noronha, G., Pozefsky, T., Charleston, J., Reynolds., Durkin, N., Rubin, R., Louis, T.A., & Brancati, F.L. (2011). Comparative effectiveness of weight-loss interventions in clinical practice. The New England Journal of Medicine, 365(21), 1959-1968.

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Obesity reduction for adults: Behavioral, low-intensity, in-person programs

Literature review updated December 2014.

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components, and often include diet and exercise components as well. For this review of interventions for adults who are obese, we excluded studies that target diabetic populations, as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted face-to-face, with fewer than 12 sessions a year or a duration of less than 12 months.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Weight change	Primary	10	1004	-0.084	0.138	-0.084	0.057	n/a	n/a	n/a	n/a
Body mass index (BMI)	Primary	4	554	-0.040	0.610	-0.040	0.079	n/a	n/a	n/a	n/a
Diastolic blood pressure	Primary	6	697	-0.146	0.047	-0.146	0.073	n/a	n/a	n/a	n/a
Systolic blood pressure	Primary	6	697	-0.112	0.154	-0.112	0.078	n/a	n/a	n/a	n/a
HDL cholesterol	Primary	4	474	0.069	0.705	0.069	0.181	n/a	n/a	n/a	n/a
LDL cholesterol	Primary	4	474	-0.205	0.041	-0.205	0.100	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

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Obesity reduction for adults: Indirect counseling (via computer or phone)

Literature review updated December 2014.

Program Description: Behavioral interventions for obesity include behavioral counseling, therapy, and educational components, and often include diet and exercise components as well. For this review of interventions for adults who are obese, we excluded studies that target diabetic populations, as well as those aimed at preventing obesity.

Programs in this specific category are delivered to obese adults, and conducted remotely, usually via computer or phone.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Weight change	Primary	9	1092	-0.115	0.013	-0.115	0.046	n/a	n/a	n/a	n/a
Body mass index (BMI)	Primary	5	608	-0.139	0.015	-0.139	0.057	n/a	n/a	n/a	n/a
Diastolic blood pressure	Primary	5	627	-0.069	0.219	-0.069	0.056	n/a	n/a	n/a	n/a
Systolic blood pressure	Primary	5	627	-0.101	0.073	-0.101	0.056	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Appel, L.J., Clark, J.M., Yeh, H.C., Wang, N.Y., Coughlin, J.W., Daumit, G., Miller, E.R., Dalcin, A., Jerome, G., Geller, S., Noronha, G., Pozefsky, T., Charleston, J., Reynolds., Durkin, N., Rubin, R., Louis, T.A., & Brancati, F.L. (2011). Comparative effectiveness of weight-loss interventions in clinical practice. The New England Journal of Medicine, 365(21), 1959-1968.

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Smoking cessation programs during pregnancy (all programs)

Literature review updated December 2014.

Program Description: Counseling cessation programs for pregnant smokers typically involving face-to-face counseling, although four studies were exclusively telephone counseling.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Regular smoking	Primary	18	3186	-0.276	0.001	-0.276	0.075	25	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Cook, C., Ward, S., Myers, S., & Spinnato, J. (1995). A prospective, randomized evaluation of intensified therapy for smoking reduction in pregnancy. American Journal of Obstetrics and Gynecology: Part 2, 172(1), 290.

Dornelas, E.A., Magnavita, J., Beazoglou, T., Fischer, E.H., Oncken, C., Lando, H., Greene, J., Barbagallo, J., Stepnowski, R., & Gregonis, E. (2006). Efficacy and cost-effectiveness of a clinic-based counseling intervention tested in an ethnically diverse sample of pregnant smokers. Patient Education and Counseling, 64, 342-349.

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Stotts, A.L., DeLaune, K.A., Schmitz, J.M., & Grabowski, J. (2004). Impact of a motivational intervention on mechanisms of change in low-income pregnant smokers. *Addictive Behaviors, 29*(8), 1649-1657.

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Oral health: Fluoride varnish treatment for permanent teeth

Literature review updated October 2014.

Program Description: Fluoride varnish is a form of fluoride that temporarily adheres to the tooth in order to maintain contact between the fluoride and the tooth for several hours. In the studies we reviewed, fluoride varnish was applied every three to six months over a 12- to 36-month time period. The analysis presented here reflects the effect of fluoride varnish applied to permanent teeth.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Tooth decay	Primary	14	3589	-0.267	0.002	-0.267	0.086	11	n/a	n/a	n/a

Citations Used in the Meta-Analysis

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Oral health: Fluoride varnish treatment for primary teeth

Literature review updated October 2014.

Program Description: Fluoride varnish is a form of fluoride that temporarily adheres to the tooth in order to maintain contact between the fluoride and the tooth for several hours. In the studies we reviewed, fluoride varnish was applied every three to six months over a 12- to 36-month time period. The analysis presented here reflects the effect of fluoride varnish applied to primary teeth.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Tooth decay	Primary	6	1042	-0.198	0.036	-0.198	0.095	8	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Chu, C.H., Lo, E.C., & Lin, H.C. (2002). Effectiveness of silver diamine fluoride and sodium fluoride varnish in arresting dentin caries in Chinese pre-school children. Journal of Dental Research, 81(11), 767-770.

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Hardman, M.C., Davies, G.M., Duxbury, J.T., & Davies, R.M. (2007). A cluster randomised controlled trial to evaluate the effectiveness of fluoride varnish as a public health measure to reduce caries in children. Caries Research, 41(5), 371-376.

Holm, A. (1979). Effect of a fluoride varnish (Duraphat®) in preschool children. Community Dentistry and Oral Epidemiology, 7(5), 241-245.

Diabetes prevention: All lifestyle programs

Literature review updated December 2014.

Program Description: Lifestyle programs target individuals at high risk for developing type 2 diabetes, providing them with counseling and other support. The programs included in this review aim to improve diet, increase physical activity, and reduce weight and the incidence of diabetes.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Diabetes incidence	Primary	11	2812	-0.387	0.001	-0.387	0.050	n/a	n/a	n/a	n/a
Weight change	Primary	12	2457	-0.221	0.001	-0.221	0.034	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Ackermann, R.T., Finch, E.A., Brizendine, E., Zhou, H., & Marrero, D.G. (2008). Translating the Diabetes Prevention Program into the community. The DEPLOY Pilot Study. American Journal of Preventive Medicine, 35(4), 357-63.

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Oral health: Resin sealants for molars

Literature review updated October 2014.

Program Description: Sealants are plastic films applied to the biting surfaces of molars to prevent decay. This analysis focuses on the effect of resin sealants compared to no treatment.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Tooth decay	Primary	12	2978	-0.973	0.001	-0.973	0.117	10	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Bravo, M., Llodra, J.C., Baca, P., & Osorio, E. (1996). Effectiveness of visible light fissure sealant (Delton) versus fluoride varnish (Duraphat): 24-month clinical trial. Community Dentistry and Oral Epidemiology, 24(1), 42-46.

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Smoking cessation programs in pregnancy (face-to-face counseling programs)

Literature review updated December 2014.

Program Description: Smoking cessation counseling interventions tailored to pregnant smokers with intensive face-to-face counseling.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Regular smoking	Primary	9	1427	-0.301	0.008	-0.301	0.114	25	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Cook, C., Ward, S., Myers, S., & Spinnato, J. (1995). A prospective, randomized evaluation of intensified therapy for smoking reduction in pregnancy. *American Journal of Obstetrics and Gynecology: Part 2, 172*(1), 290.

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Smoking cessation programs in pregnancy (programs without significant face-to-face counseling)

Literature review updated December 2014.

Program Description: Smoking cessation counseling interventions tailored to pregnant smokers without the intensive face-to-face counseling.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Regular smoking	Primary	9	1759	-0.235	0.013	-0.235	0.094	26	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Coleman, E.A., Parry, C., Chalmers, S., & Min, S. J. (2006). The care transitions intervention: results of a randomized controlled trial. *Archives of Internal Medicine, 166*(17), 1822-8.

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Obesity reduction for children: Behavioral, moderate- to high-intensity, face-to-face programs

Literature review updated December 2014.

Program Description: The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral change, including goal setting, self-monitoring, stimulus control, and other strategies. The programs in this specific category provided at least 25 hours of face-to-face intervention.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Body mass index (BMI)	Primary	14	638	-0.378	0.001	-0.378	0.087	n/a	n/a	n/a	n/a
Weight change	Primary	11	493	-0.206	0.003	-0.206	0.070	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Bocca, G., Corpeleijn, E., Stolk, R.P., & Sauer, P.J. (2012). Results of a multidisciplinary treatment program in 3-year-old to 5-year-old overweight or obese children: a randomized controlled clinical trial. Archives of Pediatrics & Adolescent Medicine, 166(12), 1109-15.

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Obesity reduction for children: Behavioral, low-intensity, face-to-face programs

Literature review updated December 2014.

Program Description: The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral change, including goal setting, self-monitoring, stimulus control, and other strategies. The programs in this specific category provided less than 25 hours of face-to-face intervention.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Body mass index (BMI)	Primary	12	778	-0.148	0.006	-0.148	0.054	n/a	n/a	n/a	n/a
Weight change	Primary	4	94	-0.201	0.160	-0.201	0.143	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

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Obesity reduction for children: Behavioral, remotely-delivered programs

Literature review updated December 2014.

Program Description: The behavioral interventions included in this analysis target obese and overweight youth under age 18, providing them with counseling, education, and other supports to improve diet, increase physical activity, and reduce weight. The programs use techniques designed to promote and sustain behavioral change, including goal setting, self-monitoring, stimulus control, and other strategies. The programs in this specific category provided were delivered remotely, usually via computer or phone.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Body mass index (BMI)	Primary	4	142	-0.151	0.249	-0.151	0.131	n/a	n/a	n/a	n/a
Weight change	Primary	3	74	-0.117	0.510	-0.117	0.178	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Doyle, A. C., Goldschmidt, A., Huang, C., Winzelberg, A. J., Taylor, C. B., & Wilfley, D. E. (2008). Reduction of Overweight and Eating Disorder Symptoms via the Internet in Adolescents: A Randomized Controlled Trial. Journal of Adolescent Health, 43(2), 172-179.

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Interventions to reduce unnecessary emergency department visits: Asthma self-management education for children

Literature review updated December 2014.

Program Description: Asthma self-management education aims to manage asthma symptoms and avoid emergency department visits by teaching children to identify and avoid asthma triggers, recognize symptoms, and take appropriate action to manage symptoms. In the studies included in this analysis, asthma self-management education was typically delivered by a social worker, nurse, or computer program. We included interventions delivered to children or children and their families in an individuals or group setting. This analysis focuses on interventions initiated in the healthcare system.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	7	688	-0.088	0.475	-0.088	0.124	n/a	n/a	n/a	n/a
Hospitalization (general)	Primary	10	1342	0.015	0.883	0.015	0.099	n/a	n/a	n/a	n/a
School attendance	Primary	4	142	0.002	0.994	0.002	0.219	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Alexander, J.S., Younger, R.E., Cohen, R.M., & Crawford, L.V. (1988). Effectiveness of a nurse-managed program for children with chronic asthma. Journal of Pediatric Nursing, 3(5), 312-317.

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Transitional care programs to prevent hospital readmissions: Comprehensive programs

Literature review updated December 2014.

Program Description: Comprehensive transitional care programs focus on preventing future hospital readmissions after dischargeinterventions include pre-discharge assistance (e.g., a transition coach, enhanced discharge planning, and primary care provider communication), as well as post-discharge follow-up.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Hospitalization (general)	Primary	11	1597	-0.289	0.001	-0.289	0.061	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Balaban, R.B., Weissman, J.S., Samuel, P.A., & Woolhandler, S. (2008). Redefining and redesigning hospital discharge to enhance patient care: a randomized controlled study. Journal of General Internal Medicine, 23(8), 1228-33.

Coleman, E.A., Parry, C., Chalmers, S., & Min, S.J. (2006). The care transitions intervention: results of a randomized controlled trial. Archives of Internal Medicine, 166(17), 1822-8.

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Patient-centered medical homes: All implementations

Literature review updated December 2014.

Program Description: The “patient-centered medical home” (PCMH) model attempts to make health care more efficient by restructuring primary care. Definitions vary, but PCMHs typically provide health care with the following features: team-based (with team members having defined roles and shared accountability); comprehensive (with the majority of health care needs being addressed); coordinated (across primary care providers, specialists, hospitals, and community service providers); patient-centered (with shared decision-making and support for patient self-management); emphasis on quality and safety (with clinical decision-support tools and methods to track care); and enhanced access (with expanded office hours and shorter waiting times).
This category includes all of the PCMH programs we reviewed.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	8	459478	-0.019	0.049	-0.019	0.010	n/a	n/a	n/a	n/a
Hospitalization (general)	Primary	8	385985	0.001	0.847	0.001	0.003	n/a	n/a	n/a	n/a
Total cost of care	Primary	6	75632	0.004	0.431	0.004	0.006	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Boult, C., Reider, L., Leff, B., Frick, K.D., Boyd, C.M., Wolff, J.L., Frey, K., ... Scharfstein, D. (2011). The effect of guided care teams on the use of health services: results from a cluster-randomized controlled trial. Archives of Internal Medicine, 171(5), 460-6.

David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? Health Services Research, 5, early online publication.

Fifield, J., Forrest, D.D., Burleson, J.A., Martin-Peele, M., & Gillespie, W. (2013). Quality and efficiency in small practices transitioning to patient centered medical homes: a randomized trial. Journal of General Internal Medicine, 28(6), 778-86.

Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Schneider, E.C., ... Volpp, K.G. (2014). Association between participation in a multipayer medical home intervention and changes in quality, utilization, and costs of care. Journal of the American Medical Association, 311(8), 815-825.

Gilfillan, R.J., Tomcavage, J., Rosenthal, M.B., Davis, D.E., Graham, J., Roy, J.A., Pierdon, S.B., ... Steele, G.D.J. (2010). Value and the medical home: effects of transformed primary care. The American Journal of Managed Care, 16(8), 607-14.

Reid, R.J., Coleman, K., Johnson, E.A., Fishman, P.A., Hsu, C., Soman, M.P., Trescott, C.E., ... Larson, E.B. (2010). The Group Health medical home at year two: cost savings, higher patient satisfaction, and less burnout for providers. Health Affairs (project Hope), 29(5), 835-43.

Reid, R.J., Johnson, E.A., Hsu, C., Ehrlich, K., Coleman, K., Trescott, C., Erikson, M., ... Fishman, P.A. (2013). Spreading a medical home redesign: effects on emergency department use and hospital admissions. Annals of Family Medicine, 11(Suppl 1), S19-S26.

Rosenthal, M.B. (2013). Effect of a multipayer patient-centered medical home on health care utilization and quality: The Rhode Island Chronic Care Sustainability Initiative Pilot Program. Jama Internal Medicine, 173(20), 1907.

Wang, Q.C., Chawla, R., Colombo, C.M., Snyder, R.L., & Nigam, S. (2014). Patient-centered medical home impact on health plan members with diabetes. Journal of Public Health Management and Practice, 20(5), E12-E20.

Werner, R.M., Duggan, M., Duey, K., Zhu, J., & Stuart, E.A. (2013). The patient-centered medical home: An evaluation of a single private payer demonstration in New Jersey. Medical Care Philadelphia-, 51(6), 487-493.

Patient-centered medical homes: Implementations with high-risk patients

Literature review updated December 2014.

Program Description: The "patient-centered medical home" (PCMH) model attempts to make health care more efficient by restructuring primary care. Definitions vary, but PCMHs typically provide health care with the following features: team-based (with team members having defined roles and shared accountability); comprehensive (with the majority of health care needs being addressed); coordinated (across primary care providers, specialists, hospitals, and community service providers); patient-centered (with shared decision-making and support for patient self-management); emphasis on quality and safety (with clinical decision-support tools and methods to track care); and enhanced access (with expanded office hours and shorter waiting times).
This category includes all PCMH programs we reviewed that focused on high-risk patients.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	3	31147	-0.034	0.252	-0.034	0.030	n/a	n/a	n/a	n/a
Total cost of care	Primary	3	12472	-0.040	0.178	-0.040	0.029	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Boult, C., Reider, L., Leff, B., Frick, K.D., Boyd, C.M., Wolff, J.L., Frey, K., ... Scharfstein, D. (2011). The effect of guided care teams on the use of health services: results from a cluster-randomized controlled trial. Archives of Internal Medicine, 171(5), 460-6.

David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? Health Services Research, 5, early online publication.

Fishman, P.A., Johnson, E.A., Coleman, K., Larson, E.B., Hsu, C., Ross, T.R., Liss, D., ... Reid, R.J. (2012). Impact on seniors of the patient-centered medical home: Evidence from a pilot study. The Gerontologist, 52(5), 703-711.

Gilfillan, R.J., Tomcavage, J., Rosenthal, M. B., Davis, D.E., Graham, J., Roy, J.A., Pierdon, S.B., ... Steele, G.D.J. (2010). Value and the medical home: effects of transformed primary care. The American Journal of Managed Care, 16(8), 607-14.

Wang, Q.C., Chawla, R., Colombo, C.M., Snyder, R.L., & Nigam, S. (2014). Patient-centered medical home impact on health plan members with diabetes. Journal of Public Health Management and Practice, 20(5), E12-E20.

Patient-centered medical homes: Implementations in integrated health systems

Literature review updated December 2014.

Program Description: The "patient-centered medical home" (PCMH) model attempts to make health care more efficient by restructuring primary care. Definitions vary, but PCMHs typically provide health care with the following features: team-based (with team members having defined roles and shared accountability); comprehensive (with the majority of health care needs being addressed); coordinated (across primary care providers, specialists, hospitals, and community service providers); patient-centered (with shared decision-making and support for patient self-management); emphasis on quality and safety (with clinical decision-support tools and methods to track care); and enhanced access (with expanded office hours and shorter waiting times).
This category includes only PCMH programs we reviewed that were implemented in integrated health systems.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	1	305578	-0.032	0.001	-0.032	0.004	n/a	n/a	n/a	n/a
Hospitalization (general)	Primary	2	314212	0.001	0.766	0.001	0.004	n/a	n/a	n/a	n/a
Total cost of care	Primary	2	15562	-0.021	0.771	-0.021	0.071	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Gilfillan, R.J., Tomcavage, J., Rosenthal, M. B., Davis, D.E., Graham, J., Roy, J.A., Pierdon, S.B., ... Steele, G.D.J. (2010). Value and the medical home: effects of transformed primary care. The American Journal of Managed Care, 16(8), 607-14.

Reid, R.J., Coleman, K., Johnson, E.A., Fishman, P.A., Hsu, C., Soman, M.P., Trescott, C.E., ... Larson, E.B. (2010). The Group Health medical home at year two: cost savings, higher patient satisfaction, and less burnout for providers. Health Affairs (project Hope), 29(5), 835-43.

Reid, R.J., Johnson, E.A., Hsu, C., Ehrlich, K., Coleman, K., Trescott, C., Erikson, M., ... Fishman, P.A. (2013). Spreading a medical home redesign: effects on emergency department use and hospital admissions. Annals of Family Medicine, 11(Suppl 1), S19-S26.

Patient-centered medical homes: Implementations in physician-led practices

Literature review updated December 2014.

Program Description: The “patient-centered medical home” (PCMH) model attempts to make health care more efficient by restructuring primary care. Definitions vary, but PCMHs typically provide health care with the following features: team-based (with team members having defined roles and shared accountability); comprehensive (with the majority of health care needs being addressed); coordinated (across primary care providers, specialists, hospitals, and community service providers); patient-centered (with shared decision-making and support for patient self-management); emphasis on quality and safety (with clinical decision-support tools and methods to track care); and enhanced access (with expanded office hours and shorter waiting times).
This category includes only PCMH programs we reviewed that were implemented in physician-led practices.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	7	153900	-0.015	0.148	-0.015	0.010	n/a	n/a	n/a	n/a
Hospitalization (general)	Primary	6	71773	0.000	0.934	0.000	0.005	n/a	n/a	n/a	n/a
Total cost of care	Primary	4	59980	0.005	0.416	0.005	0.006	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Boult, C., Reider, L., Leff, B., Frick, K.D., Boyd, C.M., Wolff, J.L., Frey, K., ... Scharfstein, D. (2011). The effect of guided care teams on the use of health services: results from a cluster-randomized controlled trial. Archives of Internal Medicine, 171(5), 460-6.

David, G., Gunnarsson, C., Saynisch, P.A., Chawla, R., & Nigam, S. (2014). Do patient-entered medical homes reduce emergency department visits? Health Services Research, 5, early online publication.

Fifield, J., Forrest, D.D., Burleson, J.A., Martin-Peele, M., & Gillespie, W. (2013). Quality and efficiency in small practices transitioning to patient centered medical homes: a randomized trial. Journal of General Internal Medicine, 28(6), 778-86.

Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Friedberg, M.W., Schneider, E.C., Schneider, E.C., ... Volpp, K.G. (2014). Association between participation in a multipayer medical home intervention and changes in quality, utilization, and costs of care. Journal of the American Medical Association, 311(8), 815-825.

Rosenthal, M.B. (2013). Effect of a multipayer patient-centered medical home on health care utilization and quality: The Rhode Island Chronic Care Sustainability Initiative Pilot Program. Jama Internal Medicine, 173(20), 1907.

Wang, Q.C., Chawla, R., Colombo, C.M., Snyder, R.L., & Nigam, S. (2014). Patient-centered medical home impact on health plan members with diabetes. Journal of Public Health Management and Practice, 20(5), E12-E20.

Werner, R.M., Duggan, M., Duey, K., Zhu, J., & Stuart, E.A. (2013). The patient-centered medical home: An evaluation of a single private payer demonstration in New Jersey. Medical Care Philadelphia-, 51(6), 487-493.

Interventions to reduce unnecessary emergency department visits: General education on appropriate ED use

Literature review updated December 2014.

Program Description: The study included in this analysis evaluated the dissemination of a booklet to all members of a health insurance plan who received Medicaid benefits. The booklet explained when to use emergency services, offered assistance in finding a primary care physician, and described self-care for minor conditions.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	1	9822	-0.032	0.128	-0.032	0.021	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Rector, T.S., Venus, P.J., & Laine, A.J. (1999). Impact of mailing information about nonurgent care on emergency department visits by Medicaid beneficiaries enrolled in managed care. The American Journal of Managed Care, 5(12), 1505-1512.

Interventions to reduce unnecessary emergency department visits: Case management for frequent ED users

Literature review updated December 2014.

Program Description: These interventions target the highest-frequency emergency department visitors, providing a case manager to assist in accessing appropriate medical care and connecting participants to community resources with the aim of reducing unnecessary emergency department visits.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Emergency department visits	Primary	2	252	-0.438	0.001	-0.438	0.095	n/a	n/a	n/a	n/a
Hospitalization (general)	Primary	2	252	-0.173	0.067	-0.173	0.094	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Shah, R., Chen, C., O'Rourke, S., Lee, M., Mohanty, S.A., & Abraham, J. (2011). Evaluation of care management for the uninsured. Medical Care, 49(2), 166-171.

Shumway, M., Boccellari, A., O'Brien, K., & Okin, R.L. (2008). Cost-effectiveness of clinical case management for ED frequent users: results of a randomized trial. The American Journal of Emergency Medicine, 26(2), 155-164.

Transitional care programs to prevent hospital readmissions: Post-discharge follow-up only

Literature review updated December 2014.

Program Description: Transitional care programs focus on preventing future hospital readmissions after discharge. Programs in this specific category include those providing post-discharge patient follow-up only, with no pre-discharge assistance.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Hospitalization (general)	Primary	5	750	-0.143	0.107	-0.143	0.089	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Bostrom, J., Caldwell, J., McGuire, K., & Everson, D. (1996). Telephone follow-up after discharge from the hospital: does it make a difference? Applied Nursing Research: ANR, 9(2), 47-52.

Dudas, V., Bookwalter, T., Kerr, K.M., & Pantilat, S.Z. (2001). The impact of follow-up telephone calls to patients after hospitalization. The American Journal of Medicine, 9(111), 26-30.

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Transitional care programs to prevent hospital readmissions: All programs, general patient populations

Literature review updated December 2014.

Program Description: Transitional care programs focus on preventing future hospital readmissions after discharge. They may include coaches, patient education, medication reconciliation, individualized discharge planning, enhanced provider communication, and patient follow-up after discharge. The effects in this analysis reflect the effects of all reviewed transitional care programs on general patient populations.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Hospitalization (general)	Primary	4	972	-0.115	0.147	-0.115	0.107	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

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Transitional care programs to prevent hospital readmissions: All programs, high-risk patient populations

Literature review updated December 2014.

Program Description: Transitional care programs focus on preventing future hospital readmissions after discharge. They may include coaches, patient education, medication reconciliation, individualized discharge planning, enhanced provider communication, and patient follow-up after discharge. The effects in this analysis reflect the effects of all reviewed transitional care programs on high-risk patient populations.

Meta-Analysis of Program Effects

Outcomes measured	Primary or secondary participant	No. of effect sizes	Treatment N	Unadjusted effect size (random effects model)		Adjusted effect sizes and standard errors used in the benefit-cost analysis					
						First time ES is estimated			Second time ES is estimated		
				ES	p-value	ES	SE	Age	ES	SE	Age
Hospitalization (general)	Primary	12	1375	-0.278	0.001	-0.278	0.060	n/a	n/a	n/a	n/a

Citations Used in the Meta-Analysis

Coleman, E.A., Parry, C., Chalmers, S., & Min, S. J. (2006). The care transitions intervention: results of a randomized controlled trial. Archives of Internal Medicine, 166(17), 1822-8.

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Riegel, B., Carlson, B., Glaser, D., & Romero, T. (2006). Randomized Controlled Trial of Telephone Case Management in Hispanics of Mexican Origin With Heart Failure. Journal of Cardiac Failure, 12(3), 211-219.

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